Alcohol Deprivation Effect: An Investigation of a Model of Alcohol Dependence and Relapse in Male and Female Long-Evans Rats

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Alcohol Dependence - Humans

- 14% of US adults have developed an alcohol dependence at some point in their life (Kessler et al 1994).
- Current treatments have a high relapse rate (40-70%) (Finney et al 1996).
- Males have more continuous drinking patterns with less periods of abstinence (Olenick and Chalmers 1991).
- In alcohol detox programs: women have higher levels of negative affect associated with alcohol craving over longer periods of time that can lead to relapse. Men have shorter periods of negative affect associated with alcohol craving that can lead to relapse (Petit et al 2017).

ADE Model

- Models alcoholism and relapse in rodents
- Baseline ethanol exposure
- Repeated cycles of ethanol deprivation and ethanol access
- ADE: statistically significantly more ethanol consumed (g/kg) on the first day of the re-access period when compared to the last 7 days of baseline ethanol consumption

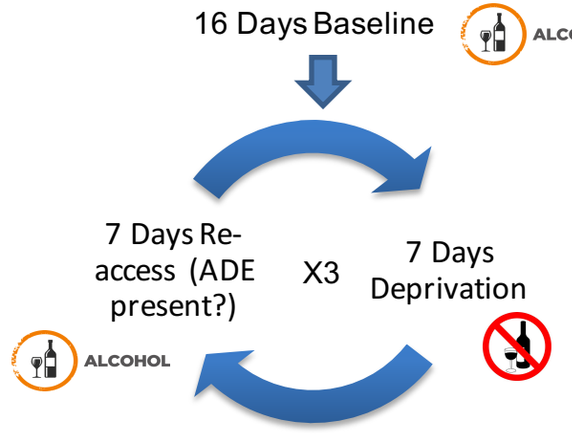
Purpose

- Test effectiveness of ADE model in adult male, adult female, and adolescent male Long Evans rats to discover differences in relapse-like behaviors in different ages and sexes.
- This version of ADE model has only previously been tested in adult male Long Evans rats.
- Hypothesis: Male rats will show an ADE that increases in magnitude as the cycles of ethanol deprivation and ethanol re-access are increased, while female rats will not show an ADE (Rosenwasser et al 2014).

Methods

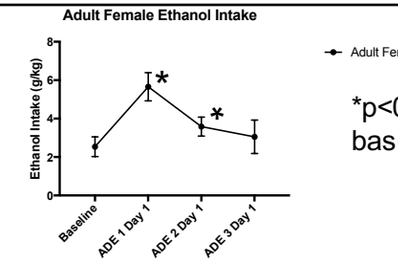
- 8 adult male, 8 adult female, 8 adolescent male Long Evans rats, single housed
- 10% ethanol solution and water 2-bottle choice method
- Ethanol intake measured at 30 min and 24 hours
- Test for presence of ADE
  - Paired, one-tailed t-test to determine statistical significance within groups

Experimental Design:
(Sinclair and Tiihonen 1988).

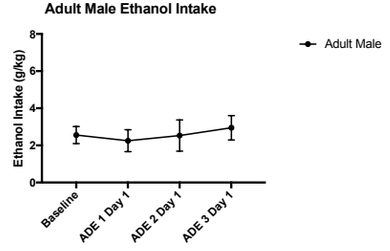


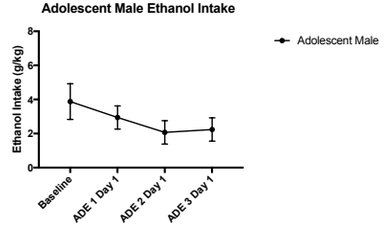
Results

- Significant ADE in adult females
  - ADE 1 Day 1 vs. Baseline
    - t(6)= 4.397, p=0.0023
  - ADE 2 Day 1 vs. Baseline
    - t(6) = 2.582, p=0.0208
  - ADE 3 Day 1 vs. Baseline
    - t(6)= 0.5086, p=0.3146
- No ADE in adult males
- No ADE in adolescent males



*p<0.05 vs. baseline





Conclusions

- Female rats were more susceptible to relapse and showed more relapse-like behaviors with this model which has not been shown in previous studies
- Future directions: this model can be used to further study female relapse behaviors and possibly investigate certain treatments to prevent relapse
- More investigation of ADE model and male vs. female addiction patterns

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